

**UPPER CLARK FORK RIVER BASIN
RESTORATION GRANT
APPLICATION**

**SHORT FORM
For
2008 GRANT CYCLE**

**Raising Awareness of Ospreys and the Clark
Fork River Restoration**

PREPARED BY:

**HEIKO LANGNER
ERICK GREENE
ROB DOMENECH**

**THE UNIVERSITY OF MONTANA AND
RAPTORVIEW RESEARCH INSTITUTE**

Applicant Information and Project Summary Form

1. Name of Applicant(s) The University of Montana
2. Project Title Raising Awareness of Ospreys and the Clark Fork River Restoration
3. Type of Entity* University
(city, corporation, private individual, association, etc.)
4. Description of Project Location (Attach maps showing project area and project location per instructions on pg. 16.) Active Osprey nests along the UCFR between Warm Springs Ponds and Milltown Reservoir
5. Injured Natural Resource(s) and/or Impaired Services to be Restored, Rehabilitated, Replaced or Equivalent Acquired through Project Public Education project aiming at school students grades 1 to 12; Determination of contamination effects on Ospreys inhabiting the UCFRB
6. Authorized Representative: Jan Madole Director
(Name) (Title)
Mailing Address: University of Montana, Office of Research
(Street/PO Box)
Missoula, MT 59812
(City/State/Zip)
(Telephone)

Contact Person*: Heiko Langner Dr.
(Name) (Title)
Mailing Address*: University of Montana – Geosciences Dept.
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Missoula, MT 59812-1296
(City/State/Zip)
Phone: 406-243-6553

E-mail Address: heiko.langner@umontana.edu

(*For Corporate, Partnership, L.L.C., or Cooperative Association applicants, list Registered Agent and Office for Service of Process)

Authorizing Statement

An authorized agent/agents representing the applicant must by his/her signature indicate that the application for funds and expenditure of matching funds, as represented, is officially authorized.

Grant Authorization

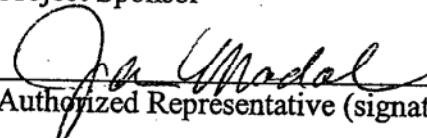
I hereby declare that the information included in and all attachments to this application are true, complete, and accurate to the best of my knowledge, and that the proposed project complies with all applicable state, local, and federal laws and regulations.

I further declare that, for UNIVERSITY OF MONTANA (Project Sponsor), I am legally authorized to enter into a binding contract with the State of Montana to obtain funding if this application is approved. I understand that the Governor must authorize funding for this project.

Project Sponsor

Date

4-3-08



Authorized Representative (signature)

Title

Jan Madole, Director
Research & Sponsored Programs

81-6001713
Fed Tax Id. No.

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Abstract

Applicant Name: Heiko Langner

Project Title: Raising Awareness of Ospreys and the Clark Fork River Restoration

Project Description and Benefits to Restoration:

To ensure the long-term success of the Upper Clark Fork Restoration Basin (UCFRB) restoration project, the river restoration must be accompanied by educational activities that will result in an environmentally aware and informed public along this Montana river system. We propose an integrated approach to public education using an iconic predatory bird species, the Osprey, which is common along the UCFRB. We will work together with two local non-profit organizations specializing in public education and outreach to involve a large number of school students of a wide range of ages. In collaboration with the Clark Fork Watershed Education Program (CFWEP), we will give several presentations in schools on Osprey natural history and their UCFRB habitat. We will select and train high school students who will independently monitor the reproductive progress of Osprey families along the Clark Fork River between Milltown Reservoir and the upstream end of the Osprey population at Warm Springs Ponds. The information gathered by these citizen scientists will be entered into a database and will serve as the basis to schedule group field trips to accessible nests with avian scientists. During these approximately 10 visits with up to 20 visitors each, Osprey chicks will be briefly brought to the ground for banding and processing and then returned unharmed to their nests. Students will stay involved with this exciting research aspect of the project with a field trip to the University of Montana Environmental Biogeochemistry Laboratory, where Osprey blood and feather tissues will be analyzed for environmental contaminants. During a final meeting, the citizen scientists will learn about the scientific results of the study they participated in.

A second leg of the educational work will be with the Montana Natural History Center (MNHC) in Missoula where we will hold day-long Osprey-related programs in six summer camps. Activities will include presentations on Osprey natural history and their UCFRB ecosystems and field trips to Osprey nests for banding and sampling. Nearly one hundred children from grades 1 to 8 will be reached through the MNHC programs.

Blood and feather samples of Osprey chicks will be analyzed for arsenic, cadmium, lead, copper, zinc, selenium and mercury, and the data will be added to a growing database, establishing Ospreys as sensitive and affordable bio-sentinels for environmental health in the UCFRB.

Technical Narrative

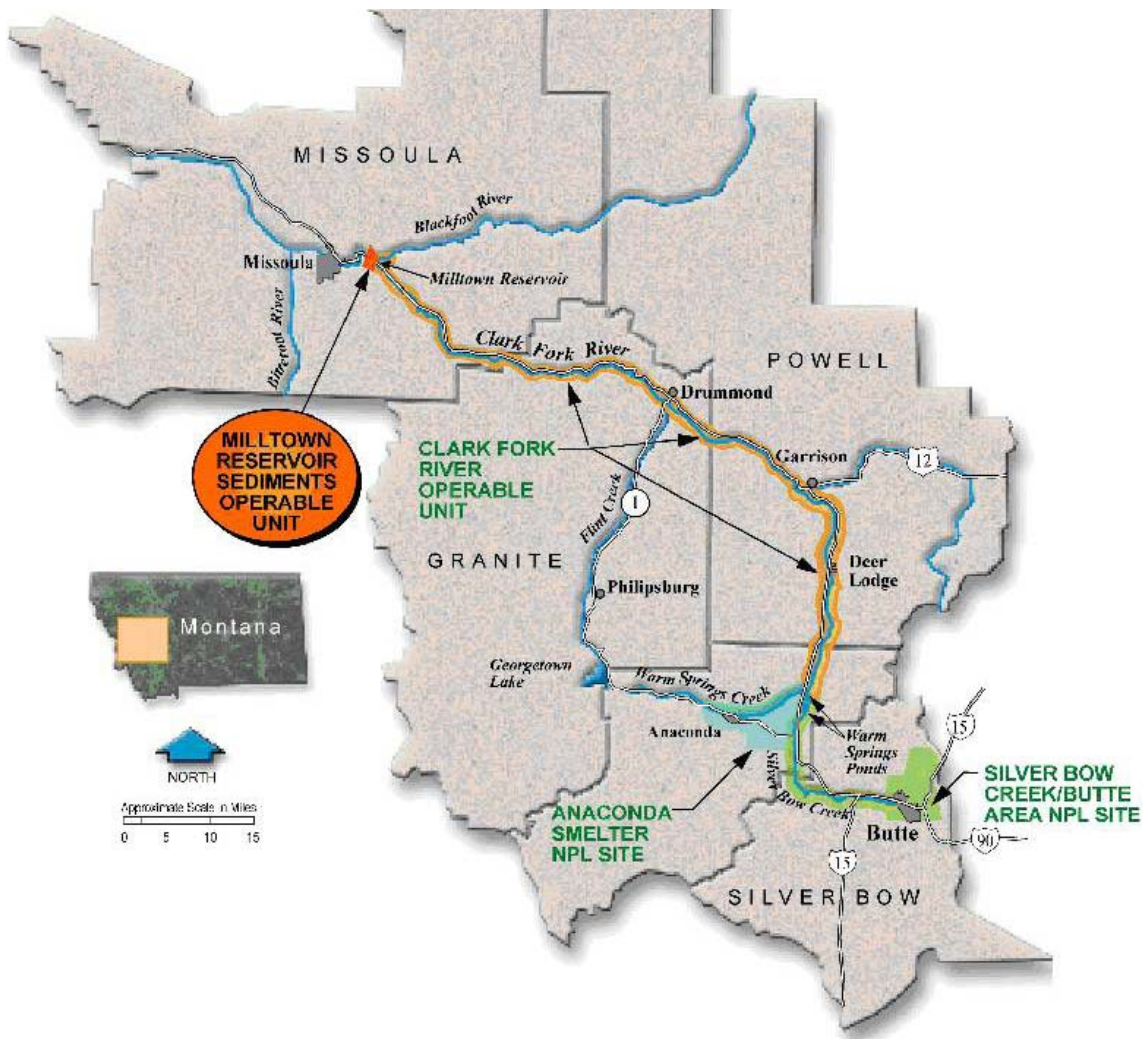
Applicant Name: Heiko Langner

Project Title: Raising Awareness of Ospreys and the Clark Fork River Restoration

A. Project Location

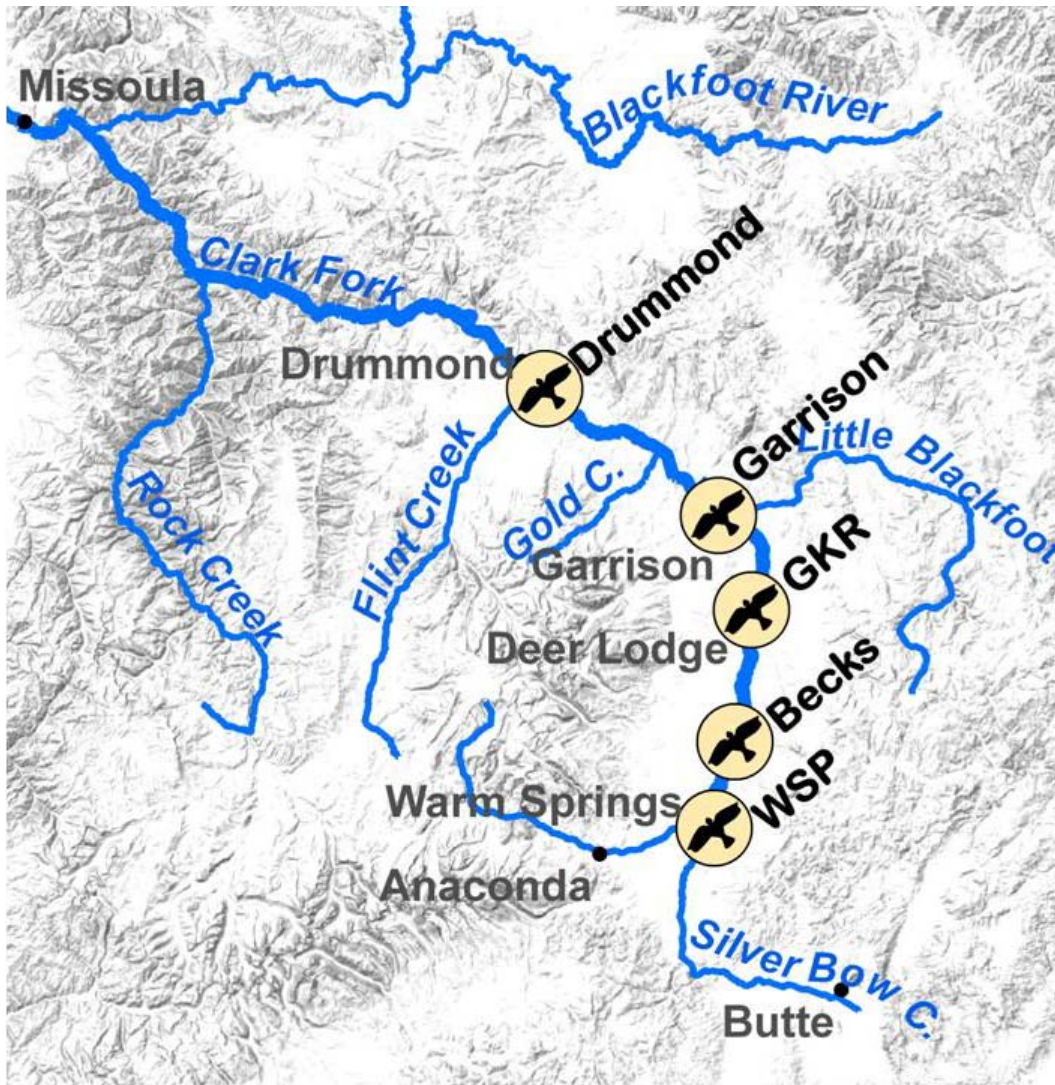
Map 1

This project is located along the complete section of the Clark Fork River where Ospreys are nesting upstream of the Milltown Dam near Missoula. This area currently coincides with the “Clark Fork River Operable Unit” as specified by the US EPA and the Warm Springs Ponds immediately upstream. There are currently about 15 known Osprey nests active in this river section that would all be included in the project. We would also include any new nests that may become active in 2008 that are located in the vicinity of Milltown Reservoir or upstream of Warm Springs Ponds. (Map Source: USEPA NPL fact sheet, <http://www.epa.gov/region8/superfund/mt/milltowncfr/cfr/#map>)



Map 2.

This map shows Osprey nest sites along the UCFRB where birds were sampled in previous years. In this project, citizen scientists will collect demographic information from all known Osprey nests along the CFR between Warm Springs Ponds and Milltown Reservoir (about 15). Blood and feather samples will be obtained from chicks in about 10 nests.



B. Project Need/Problem Definition

Environmental awareness among the general public is perhaps the most powerful key to avoiding serious damage to natural resources and to repairing inherited environmental problems. In fact, the current clean-up and restoration of the Upper Clark Fork River Basin (UCFRB) are ultimately the result of the endless efforts of dedicated citizens who were concerned with the toxic mine wastes that have impaired this riverine ecosystem for over a century. To ensure the long-term success of the UCFRB restoration project, the river restoration work must be accompanied by education activities that result in an environmentally alert and informed community along this Montana river system. Education programs can be especially effective if they address young citizens from local communities as they will be the future advocates and decision makers for environmental issues.

Ospreys (*Pandion haliaetus*) have reinhabited the river after their near-disappearance from the Lower 48 states in the 1950's and 1960's due to organochlorine pesticides (DDT) exposure. The decline of the Osprey was a key issue leading to the nationwide ban on DDT in 1972, and its recovery has become a prime example for the success of environmental action. High visibility and popularity make these "Fish Hawks" ideal subjects for public education and citizen science. Their unconditional dependence on functioning river ecosystems can be conveniently used to introduce concepts such as environmental quality, river-based food webs, flood plain habitats, wetlands, the necessity to maintain river flows during drought periods and many more.

A real need exists in assessing the health of UCFRB ecosystems before, during and after any remediation and restoration measures. This evaluation is an essential step in identifying the most urgent environmental problems and also provides a means of quantifying the success of the restoration activities. Our group has spearheaded the use of Ospreys as bio-indicators to identify effects of heavy metals in the UCFR drainage (Langner 2007). These top-of-the-food-chain predators have been successfully used for this purpose in a number of contaminated riverine and coastal environments (Henny et al. 1991; Toschik et al. 2005; Hopkins et al. 2007; Rattner et al. 2008). Results for the UCFRB show that concentrations of mercury and possibly selenium in Osprey chicks are highly elevated and exhibit a strong local signature. They may in some sections of the river have significant effects on the ospreys, and more generally on the riverine ecosystem. Therefore, the success of future restoration projects may be highly dependent on how they address mercury and selenium, in addition to the traditionally considered contaminants such as arsenic, cadmium, copper, lead, and zinc.

During the past two years we have demonstrated that we are able to utilize Ospreys in highly successful educational efforts that have produced scientific achievements of high school and undergraduate university students of national recognition. These activities are listed in a separate section of this narrative (see pg. 12).

C. Project Goals and Objectives

One goal of the project is to raise environmental awareness among school students and to alert them to the environmental issues in the UCFRB. Using an iconic species—the Osprey that is common along the UCFR—local school students will learn about the river-

based food web and the effects that toxic mine wastes have in the ecosystem. They will obtain hands-on experience as they independently gather field data and will observe bird blood sampling and laboratory analysis. Both the field and laboratory data will be added to a growing dataset that will be used as a bio-assessment tool of impaired rivers and to measure the success of restoration activities. Another goal is to wake or enhance the interest of school children in science and to lead them through a complete sequence of scientific discovery from asking a question through the process of data collection and finally drawing conclusions and reporting of the findings.

To achieve these goals we will work with the Clark Fork Watershed Education Program (CFWEP) to identify a number of interested high school students. We will train these citizen scientists during seminars and field trips so they will be able to independently gather demographic and reproductive data from a number of Osprey nests between Warm Springs Ponds and Missoula. The highlights will be joint field trips with avian scientists when Osprey chicks from accessible nests will be brought to the ground for banding and blood sampling. Students will learn about analytical techniques during another field trip to the UM Environmental Biogeochemistry Lab, where all tissue samples will be analyzed. The demographic and chemical analytical data will be added to a database to correlate contaminant levels in the birds with those in the river and to identify effects on the Osprey population along the UCFR. The students will have a chance to see the final outcome of their research during a final meeting when the results of the project will be presented.

We will be able to reach a large number of younger school children through our participation in summer camps offered by the Montana Natural History Center (MNHC) in Missoula. We will teach the campers about the Ospreys in the UCFRB and the environmental challenges they face during presentations and when they join us on banding and sampling field trips.

D. Project Implementation Plan

The three project PI's will each be responsible for individual parts of the project. We have already identified and secured funding for two University of Montana undergraduate students who will coordinate much of the effort and who will maintain the database of field data that is being gathered by the citizen scientists. The students will work part time on this program while dedicating the remainder of their summer employment to different Osprey related projects.

Preliminary work

The PI's have been working with the Clark Fork Watershed Education Program (CFWEP) officials on a plan for the citizen science part of the project. A number of written statements of support have been gathered from high school science teachers from communities along the UCFRB (see Supporting Technical Documentation section). As a second leg of the project, participation in six one-week long summer camps with the Montana Natural History Center (MNHC) have been scheduled where we will work with school children between 1st and 8th grade.

Prior to the arrival of the Ospreys from their wintering grounds this spring the PI's will work with the Northwestern Energy Corporation who may agree to install several new nesting platforms for Ospreys along strategic sections of the CFR or move currently inaccessible nests from power poles onto newly installed platforms nearby. We expect to include in this project about 15 Osprey nests that are located along the CFR between Warm Springs Ponds and Milltown Reservoir. Our preliminary studies included nest sites along the CFR downstream of Milltown Reservoir and control sites from the Big Blackfoot River and Bitterroot River watersheds. We are seeking funding from other sources and in kind contributions to continue some Osprey blood sampling in these locations if possible.

The students coordinating the field efforts will work with Langner to create a large Excel table or a Microsoft Access database where they will enter important field observations delivered by the project participants. This information will be used to optimize the field sampling schedule.

Citizen Science Project with the Clark Fork Watershed Education Program (CFWEP)

Two meetings with interested high school students will be held during the school year (last week of May) in Drummond and Butte. The meeting dates and locations will be coordinated by the CFWEP. At each of the two initial meetings, Langner or Greene will give a presentation on Osprey biology and environmental issues in their UCFRB habitat. We will have sign up sheets for students to become "citizen scientists" and adopt active nests in their vicinity, where they agree to conduct at least three visits and log activities on a nest. Few days later, each of the citizen scientists will accompany a field trip led by one of the PIs where they will learn how to obtain field data from "their" Osprey nests. The citizen scientists will fill out a form during each visit and will assess the developmental stage of the Osprey chicks. They will report their field data as soon as possible to the person maintaining the central database. This information will allow the PIs to schedule field trips with a boom truck to nests that were selected for banding and blood sampling. The optimal age for blood and feather sampling is when the chicks have grown to nearly adult size but have not fully developed flight feathers yet, i.e. between 5 and six weeks of age. These field trips will be coordinated with the citizen scientists and with CFWEP to enable the presence of reasonable group sizes (up to 20 visitors) of interested individuals (see email from Matt Vincent, CFWEP, dated 3/21/2008 in Supporting Technical Documentation). In general, few encounters with wildlife are as predictable as the banding and sampling of young Ospreys, which makes these trips ideal for wildlife-related field trips of groups of school-age youth. In hot weather, sampling has to be confined to the cooler morning hours to reduce heat-related stress on the chicks. Therefore, a maximum of only two nest visits can be planned per day of sampling.

Osprey sampling is relatively noninvasive and in our experience never caused any detrimental effects on a bird. All PIs hold the Federal, State and University of Montana permits necessary for handling and sampling these raptors (See Part G. Supporting Technical Documentation). Typically, we get all equipment unpacked and ready to use before approaching the nest. Then we drive up to the nest with a boom truck and secure it by lowering the outriggers. One of the PIs or an employee of the power company (if nest is on a power pole) moves up to the nest where in most cases the Osprey chicks try to

protect themselves by laying down in the nest and remaining motionless. The chicks can easily be removed from the nest and brought to the ground, where they are weighed and banded. We use standardized aluminum or color coded bands that are provided by the U.S. Geological Survey which is charged with the oversight of the Federal bird banding program. We periodically report all used band numbers and associated bird information to the USGS for entry into a central database. A sterile disposable syringe is used to draw a small, <3 mL blood sample from the brachial vein after sterilizing the skin around the area. The blood sample is immediately split into three subsamples for heavy metals and DNA analysis and then stored on ice until return to the laboratory where samples are stored frozen until analysis. In addition to the blood sample, three fully developed cover feathers are cut around the neck of the bird to be analyzed similarly to the blood samples. In case of hot temperatures we spray the chicks with water while they are on the ground to keep them cool. The chicks are then returned to the nest and the truck is moved away, allowing the parents to get back on the nest, which usually happens within seconds or minutes. The complete process takes a maximum of about half an hour.

The bird banding and sampling date will be the highlight of the field work for the citizen scientists and we will try to schedule trips so every participant can be present for at least one sampling date. We anticipate that about five field trips will be necessary with the boom truck to access 8 to 10 nests along the UCFRB over a period of six weeks between the last week in June and the second week in August.

The laboratory analysis of the blood and feather samples will be conducted in the fall after the end of the field season. A field trip will be organized where the citizen scientists can learn about the process of sample preparation and analysis in the University of Montana Environmental Biogeochemistry Lab. This trip will be scheduled by the CFWEP for the fall semester in cooperation with Langner. After completion of the sample analysis, the PI's will compile and analyze the data and prepare a presentation of the results. A final meeting with all project participants will be scheduled during the winter month of 2008/09 where the PI's will summarize the results of the Osprey demographic data collected by the citizen scientists and analyze them in light of the contaminant concentrations that were found in the young birds.

Montana Natural History Center (MNHC) Summer Camps

This part of the project will contribute to our goals by reaching nearly one hundred summer campers of the MNHC and teaching them about Ospreys along the Upper Clark Fork River and the environmental challenges these birds face. In cooperation with MNHC staff we have identified six week-long summer camps running between June 23 and July 25, where we will give one presentation with slides and short films and then host a field trip to an Osprey nest where we will bring chicks to the ground and band and sample them. A list of the camps is contained in the following table:

Dates	Title of Camp	Age of participants
June 23 – 27	Feathered Friends	Grades 1 – 3
July 7 – 11	Birds of Prey	Grades 3 – 5
July 14 – 18	Predator and Prey	Grades 3 – 5
July 14 – 18	Wildlife Wizardry	Grades 1 – 3
July 14 – 18	Junior Nature Detectives	Grades 1 – 3
July 21 – 25	Adventures in Science	Grades 5 – 8

Why do We Include Research Questions in this Education Project

At first glance, it may not seem intuitive why a significant portion of the project funding will be used for bird tissue analysis, even though this is primarily an educational project. However, upon a closer look it becomes clear that the educational goals cannot be met without the tissue analyses, for the following reasons:

1. Both the CFWEP and MNHC have indicated that it is the outlook of working with “real scientists” that is most attractive and motivating to their youth “clients”. This may greatly promote the students’ general interest in science, which is a subject of great national attention.

2. Bringing ospreys to the ground and getting an intimate look at these magnificent birds may be a once-in-a-lifetime experience for many people and will leave a lasting effect of connectiveness with nature and environmental awareness on young citizens.

3. It would be unethical to expose the birds to the stress of removal from the nest, merely for the purpose of us humans taking a close look at them. Obtaining data that can ultimately lead to an improved habitat for the Osprey makes this invasion much more justifiable.

3. The PI’s of this project are teachers, and education is a very important part of their professional life. However, as academic scientists we are judged by our scientific productivity. A project that consumes as much time and energy as this one will therefore have to yield scientifically valuable results; otherwise the PI’s would not be able to commit to it.

Evidence of Educational Activities to Date

During the past two years we have been committed to using Ospreys as an educational hook to involve students and the general public in scientific issues dealing with the Clark Fork watershed. We have spent a great deal of time especially mentoring younger children and students. In a relatively short time these activities have already produced some exciting and tangible results:

Summer 2007

We worked with the local middle schools and high schools and the ***Flagship Program***, which offers summer camps for students. We organized and ran an Osprey Flagship program, in which we spent one afternoon per week taking middle school students out in the field along the Clark Fork River. We used Ospreys to introduce students to a wide

variety of environmental issues, such as the history of mining in the upper Clark Fork watershed, the Mill Town Dam removal project, environmental contaminants in the Clark Fork River, and other issues.

Through Raptor View Research Institute and Women's Opportunity Resources and Development in Missoula (<http://www.wordinc.org/index.php>), we took about 60 children who are homeless or at risk of being homeless out in the field to help with banding Osprey chicks. These children were able to watch us get Osprey chicks from their nests, and help band and measure Osprey chicks. We took these opportunities to talk to the children about the problems some of the Osprey chicks face in the Clark Fork watershed.

Mentoring of high school students

We have been working closely with Max Egenhoff and Matt Parker, two students from Hellgate High School in Missoula. We have carefully mentored these two students as they helped out with research on Ospreys. As a result they have:

- ❖ been co-presenters on a professional oral paper on Ospreys at the 2008 Wildlife Society Conference in Missoula, Montana. They were the youngest presenters by far at the conference, and we have had many positive comments from professional biologists.
- ❖ presented their research on Ospreys at regional science fairs in Butte and Salt Lake City.
- ❖ been awarded First Prize in their division in the regional science fairs, and as a result have been awarded an all-expenses trip to present their research on Ospreys at the National Science Fair in Atlanta, Georgia.

Mentoring of university undergraduates

We have also worked closely Anička Kratina-Hathaway and more recently with Amanda Ormisher. As a result of our mentoring, Anička has:

- ❖ Been a co-presenter on the Osprey talk at the 2008 Wildlife Society Conference.
- ❖ Been awarded three research awards to help with her Osprey research.
- ❖ Been selected to present a talk on Ospreys at The University of Montana Undergraduate Research Conference in April.
- ❖ Been selected to present her research at the National Undergraduate Research Conference in Flagstaff, Arizona in April 2008.
- ❖ Been awarded a summer fellowship to continue research on Ospreys.

Amanda has applied for a research grant from the Audubon Society. She has also been awarded a summer fellowship to help with Osprey research.

E. Project Time Schedule

Date	Activity
April 2008 (in kind)	Field trip of PI's along the UCFR to log Osprey activity at known nest sites and identify new sites
Last week of May	Two informational meetings/presentations with high school students in UCFR communities, in coordination with CFWEP, probably in Butte and Drummond or Missoula; citizen scientist recruiting
First week of June	Three field trips with citizen scientists and interested individuals to all known Osprey nests along UCFR, assignment of nest sites to citizen scientists, data recording and reporting instructions
Early June – September	Independent observation field trips by the citizen scientists to adopted nests, observe Osprey activity, fledging success and start of migration; report observation to coordinator a.s.a.p.
Mid June – mid August	Four banding and sampling field trips with boom truck to accessible nests with chicks. Timing dependent on developmental stage of nestlings (5 – 6 weeks of age). Attended by citizen scientists and groups of students (arranged by CFWEP)
June 23 – July 25	Osprey presentations and field trips with six MNHC summer camps, grades 1 – 8, one day each, requires several observational field trips by PI's to identify suitable nests for banding/sampling chicks
October – November	Feather and blood analysis at UM Environmental Biogeochemistry Laboratory
December 2008	Field trip with citizen scientists to UM EBL
December 2008	Final meeting with citizen scientists and presentation of results

F. Qualifications of the Project Team

Rob Domenech is the director of Raptor View Research Institute, a Missoula-based non-profit organization working on a number of raptor-related projects. Rob has banded and wing-tagged over 105 Golden Eagles and more than 500 other raptors. He holds the Federal Raptor Banding Permit of which Greene and Langner are sub-permittees, and which is the basis for the Montana State and University of Montana permits (see Supporting Technical Documentation). Dr. Erick Greene is Professor at the University of Montana, Division of Biological Sciences and has over 25 years of experience with avian conservation studies, including ospreys. He was one of the founders of the Montana Natural History Center. Dr. Heiko Langner is Assistant Research Professor and Director

of the Environmental Biogeochemistry Laboratory at the University of Montana, Geosciences Department. He has worked on arsenic and metals contamination in the UCFRB for years and has been studying heavy metals exposure of Ospreys and other raptors over the past two years.

G. Supporting Technical Documentation

Reference List

Henny,C.J., Blus,L.J., Hoffman,D.J., Grove,R.A., and Hatfield,J.S. 1991. Lead accumulation and osprey production near a mining site on the coeur d'Alene River, Idaho, *Archives of Environmental Contamination and Toxicology* 21: 415-424.

Hopkins,W.A., Hopkins,L.B., Unrine,J.M., Snodgrass,J., and Elliot,J.D. 2007. Mercury concentrations in tissues of osprey from the Carolinas, USA, *Journal of Wildlife Management* 71: 1819-1829.

Langner, H. W. Researcher finds high osprey mercury levels. Helena Independent Record . 3-20-2007.

Ref Type: Newspaper

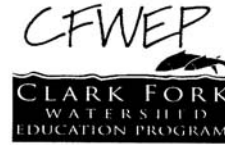
Rattner,B.A., Golden,N.H., Toschik,P.C., McGowan,P.C., and Custer,T.W. 2008. Concentrations of metals in blood and feathers of nestling ospreys (*Pandion haliaetus*) in Chesapeake and Delaware Bays, *Archives of Environmental Contamination and Toxicology* 54: 114-122.

Toschik,P.C., Rattner,B.A., McGowan,P.C., Christman,M.C., Carter,D.B., Hale,R.C., Matson,C.W., and Ottinger,M.A. 2005. Effects of contaminant exposure on reproductive success of ospreys (*Pandion haliaetus*) nesting in Delaware River and Bay, USA, *Environmental Toxicology and Chemistry* 24: 617-628.

Letters of Support from MNHC and CFWEP and Dave Taylor Roofing

4 Pages

Natural Resource Damage Program (NRDP)
Montana Department of Justice
P.O. Box 201425
Helena, MT 59620



March 13, 2008

Re: Clark Fork Watershed Education Program (CFWEP) support for University of Montana's *Ospreys and Citizen Science* NRDP small grants program proposal

Dear NRDP Staff:

CFWEP would like to express its full support for the proposal submitted by the University of Montana (Departments of Geosciences and Biology, with collaboration from Raptor View Research Center non-profit organization) to develop and implement an osprey research and public education program throughout the Upper Clark Fork River Basin. We base this support on the individual success of all of the proposal's parties, regarding education and community involvement in science; the recent public support shown to similar avian-related programs in the Clark Fork; and preliminary interest expressed by a number of teachers and students within the watershed.

The proposed program would not only increase citizen awareness of restoration activities as they relate to the ecological inhabitants of their communities, but also would provide students with a unique opportunity to take active part in avian science. This opportunity would apply to students in elementary, middle and high school, in addition to encouraging the involvement of their parents. The Avian Science Center's bird-banding program run last summer at three sites throughout the basin was very successful at drawing a vast attendance at its events. With this proposal's focus on a magnificent bird such as the osprey, in addition to a planned increase in public and student education and recruitment, the osprey project has the potential to draw even more people out of their living rooms and into the watershed.

Over the past four years, the CFWEP has worked with over 7,000 students and teachers, and an ever-increasing fraction of the public on watershed and restoration science-related issues in the Upper Clark Fork. The applicants for the osprey project have been very successful with informing and involving the public on raptor related issues, as well as working with individual students on research projects, such as an award-winning science fair project of two Missoula high school students the past several years. This proposal allows what we feel will be a continued success for all of the parties involved, most notably the basin's citizens and students. While CFWEP is shifting its NRDP funding priorities to focus specifically on grades 5-9, it is still within our program's goals with significant benefits to get both older and younger students and the general public involved and interested in the science around them. It can be reasonably expected that many students in grades 5-9 would also become involved at some level with the osprey project.

Technical Outreach
Montana Tech
1300 West Park Street
Butte, MT 59701
(406) 496-4143
www.cfwep.org



As part of the planning process for this proposal, the CFWEP, through a form, helped the applicants gauge interest and support at a number of school-related functions, teacher workshops and other gatherings. Presently, there have been nine elementary, middle school and high school teachers ranging from Missoula to Butte and including Deer Lodge, Anaconda and Ramsay, who indicated they would be interested in taking part in an osprey education program. Further, some of the faculty and at least two undergraduate students within the Montana Tech Department of Biological Sciences have expressed interest in working on this exciting project. CFWEP would also pledge 40 hours of its Americorps VISTA's time in helping primarily with recruitment and exposure of the proposal, if funded.

We are very excited at the prospect of being able to work with University of Montana and Raptor View Research Center through its proposed Osprey and Citizens Science program and urge you to give it your fullest consideration for funding.

Sincerely,

Matt S. Vincent
CFWEP Director

cc: Heiko Langner, Biogeochemistry Laboratory, University of Montana

Technical Outreach
Montana Tech
1300 West Park Street
Butte, MT 59701
(406) 496-4143
www.cfwep.org



Montana Natural History Center

Your Base Camp for Discovery

120 Hickory Street
Missoula, MT 59801
406-327-0405

www.MontanaNaturalist.org

.....

Natural Resource Damage Program (NRDP)
Montana Department of Justice
P.O. Box 201425
Helena, MT 59620

March 17, 2008

Dear NRDP Staff:

The Montana Natural History Center (MNHC) would like to express its full support for the osprey project proposal submitted by the University of Montana (Departments of Geosciences and Biology, with collaboration from Raptor View Research Center non-profit organization) to develop and implement an osprey research and public education program throughout the Upper Clark Fork River Basin.

Each summer MNHC offers summer camp programs that keep kids engaged in learning and active in the outdoors while they are not at school. The Summer Science Discovery Day Camps are week-long programs that include natural history and general science content, field trips, and opportunities for exploration of local natural areas. These very popular programs are expected to enroll more than 375 students ages 4 through 14 in the summer of 2008. Our goal is to provide programming that is both educational and fun.

We work with professional biologists and scientists to incorporate real research into our camp programs. We believe that exposing children to the real work of scientists will help them to see the applications of science-based careers and encourage students to see possibilities for their own future. It is an unfortunate fact that a high percentage of students lose their interest in science and scientific careers during their middle school years. The MNHC is working hard to stop and reverse this trend, and interactions with environmental experts cannot be overvalued in this endeavor. Learning about Ospreys and their Clark Fork environment will be a real highlight of these week-long camps. It is important to educate school students about the need to protect the aquatic resources in Montana and about existing environmental problems and the public efforts to repair them. The field trip to an Osprey nest will let the kids participate in a real-life scientific research project. They will not only get a very close look at one of the most prominent birds of prey of the Clark Fork River, but this will make the work of scientists more familiar to them.

While we cannot offer cash funding for the Osprey presentations and field trips, we would like to point out that the MNHC is adding a significant amount of in kind support to this grant project: Each day of camp costs an average of \$30.00 per participant. With 15 campers in each group, we will essentially be adding \$2,700 by working on the Osprey project for one day with each of six camps.

MNHC provides high quality science and natural history education for the community. However we rely on our partners like the University of Montana to infuse our programs with one-of-a-kind experiences. This project will provide opportunities for children that they will never forget while showing them how important science is in the world. We are very excited about the opportunity to work with the work with University of Montana and Raptor View Research Center through the proposed osprey program and urge you to fully consider the impact this program can have with your funding support.

Sincerely,

Lisa Bickell
Education Director
cc: Heiko Langner, Biogeochemistry Laboratory, University of Montana

.....

*Our mission is to promote and cultivate the appreciation, understanding,
and stewardship of nature through education*

DAVE TAYLOR ROOFING, INC.

THE PROFESSIONAL ROOFERS

501 A North California Street - Missoula, MT - Phone: (406) 728-3707 - Fax: (406) 728-9123

March 26, 2008

To whom it may concern,

I am very excited to continue my support of Rob Domenech, with Raptor View Research Institute, Heiko Langner and Erick Greene with The University of Montana with their Osprey research and education project along the Clark Fork River. I am glad to hear that they are expanding their efforts to include more of Montana's youth in this very important worthwhile project this year.

I will continue to donate my bucket truck to the project whenever they are needed. This is a value of \$200 per hour. Please feel free to contact me at 406.546.9945 should you have any questions.

Sincerely,



Dave Taylor

Dave Taylor Roofing

MAR-27-2008 09:50 AM DAVE TAYLOR ROOFING 4067289123 P.01

Email from Matt Vincent, CFWEP, Dated 3/21/2008

From: Vincent, Matt [mailto:MVincent@mtech.edu]

Sent: Friday, March 21, 2008 12:52

To: Heiko Langner

Cc: Ringsak, Justin

Subject: RE: Osprey project proposal

Hey there, Heiko,

Kathy asked me some questions regarding the field trips and I think I got her the information she was looking for. She just wants us to work it into the proposal so it is more clear what will be accomplished.

Here are the details she's looking for:

- 1) CFWEP will recruit citizen scientists for the project in the areas above Missoula. Once recruited, CFWEP will coordinate their attendance at field trainings and the actual banding/blood drawing field events. We will also coordinate field trips of these citizen scientists to the UM lab and the final, conclusive meeting where citizen-collected data will be presented to show how it was incorporated into the entire project.
- 2) CFWEP has identified teachers of interest in the basin, who would possibly want osprey program staff to visit their classroom and would be able to recruit students and their parents for citizen scientist slots and raise the general awareness of what will be done during the summer and how they can fit into the project. CFWEP can also organize field trips for interested classes to take to nest sites during the school year to learn citizen scientist observation skills and basic osprey ecology.
- 3) CFWEP will work with UM to strategically involve summer camps/student groups during the summer to take field trips to nest sites and/or on sampling events. Group sizes need to be ~20-25 students, therefore the strategic nature of the involvement.

These are the major details I understood she had questions on in my conversation. Heiko, let me know if you'd like me to revise language in the technical narrative of the proposal or if you want to take a shot at it yourself.

Hope you have a Happy Easter!

- Matt

Questionnaires with indication of interest by teachers of UCFRB communities

9 Pages

Osprey Education in the Clark Fork Basin

Background:

The Raptor View Research Institute, a non-profit organization based in Missoula and working with scientists from the University of Montana, in association with the Clark Fork Watershed Education Program (CFWEP), is interested in developing an education outreach program based on their ongoing research on osprey in the Clark Fork Basin. The program would match schools in the basin with osprey nesting sites near the river, involving students in visual monitoring of the site during the summer. Involved students and teachers would then have the opportunity to attend the actual sampling event at their site (typically in July), giving them a chance to handle osprey and work with professional scientists. Background education on the Institute's research and osprey ecology would be presented to involved teachers and/or students by Institute scientists and/or CFWEP staff during the regular school year. The osprey education program would also work with the CFWEP to develop a unit and/or lesson plan for inclusion in the Clark Fork Teaching Trunks, a resource for teachers, as part of the CFWEP's revision of those materials.

More Information:

Visit www.raptorview.org or contact Justin Ringsak, CFWEP, at 496-4897, or jringsak@mtech.edu

Gauging Interest:

As part of the Institute's grant proposal for this project, the CFWEP is seeking feedback from teachers regarding their interest in participating. If you would be interested in participating in the osprey education project, please fill out the form below:

Name: Carrie Brunger

School: Clark Fork School

Grade Level: 3rd-5th grade

Subject(s): ALL

Email: carrie@clarkforkschool.org

Phone: 542-5058

Signature: Carrie Brunger Date: 1-26-08

Osprey Education in the Clark Fork Basin

Background:

The Raptor View Research Institute, a non-profit organization based in Missoula and working with scientists from the University of Montana, in association with the Clark Fork Watershed Education Program (CFWEP), is interested in developing an education outreach program based on their ongoing research on osprey in the Clark Fork Basin. The program would match schools in the basin with osprey nesting sites near the river, involving students in visual monitoring of the site during the summer. Involved students and teachers would then have the opportunity to attend the actual sampling event at their site (typically in July), giving them a chance to handle osprey and work with professional scientists. Background education on the Institute's research and osprey ecology would be presented to involved teachers and/or students by Institute scientists and/or CFWEP staff during the regular school year. The osprey education program would also work with the CFWEP to develop a unit and/or lesson plan for inclusion in the Clark Fork Teaching Trunks, a resource for teachers, as part of the CFWEP's revision of those materials.

More Information:

Visit www.raptorview.org or contact Justin Ringsak, CFWEP, at 496-4897, or jiringsak@mtech.edu

Gauging Interest:

As part of the Institute's grant proposal for this project, the CFWEP is seeking feedback from teachers regarding their interest in participating. If you would be interested in participating in the osprey education project, please fill out the form below:

Name: Jann Clouse
School: Target Range
Grade Level: 5
Subject(s): all major subjects
Email: clouse@target.k12.mt.us
Phone: 549-9239
Signature: Jann C Clouse Date: 1-26-08

Osprey Education in the Clark Fork Basin

Background:

The Raptor View Research Institute, a non-profit organization based in Missoula and working with scientists from the University of Montana, in association with the Clark Fork Watershed Education Program (CFWEP), is interested in developing an education outreach program based on their ongoing research on osprey in the Clark Fork Basin. The program would match schools in the basin with osprey nesting sites near the river, involving students in visual monitoring of the site during the summer. Involved students and teachers would then have the opportunity to attend the actual sampling event at their site (typically in July), giving them a chance to handle osprey and work with professional scientists. Background education on the Institute's research and osprey ecology would be presented to involved teachers and/or students by Institute scientists and/or CFWEP staff during the regular school year. The osprey education program would also work with the CFWEP to develop a unit and/or lesson plan for inclusion in the Clark Fork Teaching Trunks, a resource for teachers, as part of the CFWEP's revision of those materials.

More Information:

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Gauging Interest:

As part of the Institute's grant proposal for this project, the CFWEP is seeking feedback from teachers regarding their interest in participating. If you would be interested in participating in the osprey education project, please fill out the form below:

Name: Carmen Hauck
School: Big Sky H.S.
Grade Level: 9-12
Subject(s): Integrated Biological Earth Systems, Chemistry
Email: cchauck@mtps.k12.mt.us
Phone: 728-2400 x 8660 (wk) 880-8660 (h)
Signature: Carmen C. Hauck Date: 1/26/08

Osprey Education in the Clark Fork Basin

Background:

The Raptor View Research Institute, a non-profit organization based in Missoula and working with scientists from the University of Montana, in association with the Clark Fork Watershed Education Program (CFWEP), is interested in developing an education outreach program based on their ongoing research on osprey in the Clark Fork Basin. The program would match schools in the basin with osprey nesting sites near the river, involving students in visual monitoring of the site during the summer. Involved students and teachers would then have the opportunity to attend the actual sampling event at their site (typically in July), giving them a chance to handle osprey and work with professional scientists. Background education on the Institute's research and osprey ecology would be presented to involved teachers and/or students by Institute scientists and/or CFWEP staff during the regular school year. The osprey education program would also work with the CFWEP to develop a unit and/or lesson plan for inclusion in the Clark Fork Teaching Trunks, a resource for teachers, as part of the CFWEP's revision of those materials.

More Information:

Visit www.raptorview.org or contact Justin Ringsak, CFWEP, at 496-4897, or jringsak@mttech.edu

Gauging Interest:

As part of the Institute's grant proposal for this project, the CFWEP is seeking feedback from teachers regarding their interest in participating. If you would be interested in participating in the osprey education project, please fill out the form below:

Name: Bob Andrews
School: Meekins Hill M.S.
Grade Level: 7
Subject(s): Life Sci
Email: randrews@mcps-K12-MT-US
Phone: 406-273-6024 home 542-4045 school
Signature: Robert Andrews Date: 1/26/08

Osprey Education in the Clark Fork Basin

Background:

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Gauging Interest:

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Name: Christine Leisheimer
School: Fred Mordy Middle School
Grade Level: 6
Subject(s): Science
Email: c.leisheimer@sd10.org
Phone: 560-3770
Signature: Christine Leisheimer Date: 1/20/08

Osprey Education in the Clark Fork Basin

Background:

The Raptor View Research Institute, a non-profit organization based in Missoula and working with scientists from the University of Montana, in association with the Clark Fork Watershed Education Program (CFWEP), is interested in developing an education outreach program based on their ongoing research on osprey in the Clark Fork Basin. The program would match schools in the basin with osprey nesting sites near the river, involving students in visual monitoring of the site during the summer. Involved students and teachers would then have the opportunity to attend the actual sampling event at their site (typically in July), giving them a chance to handle osprey and work with professional scientists. Background education on the Institute's research and osprey ecology would be presented to involved teachers and/or students by Institute scientists and/or CFWEP staff during the regular school year. The osprey education program would also work with the CFWEP to develop a unit and/or lesson plan for inclusion in the Clark Fork Teaching Trunks, a resource for teachers, as part of the CFWEP's revision of those materials.

More Information:

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Gauging Interest:

As part of the Institute's grant proposal for this project, the CFWEP is seeking feedback from teachers regarding their interest in participating. If you would be interested in participating in the osprey education project, please fill out the form below:

Name: Robin Anderson
School: Ramsay
Grade Level: 7 & 8
Subject(s): Life & Earth Science
Email: rande56776@bresnan.net (Home) - (School) Andersonr1@ramsay.k12.mt.us
Phone: 782-5470 (School) 723-3168 Home
Signature: Robin Anderson Date: 11/28/18

Osprey Education in the Clark Fork Basin

Background:

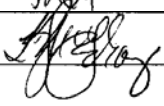
The Raptor View Research Institute, a non-profit organization based in Missoula and working with scientists from the University of Montana, in association with the Clark Fork Watershed Education Program (CFWEP), is interested in developing an education outreach program based on their ongoing research on osprey in the Clark Fork Basin. The program would match schools in the basin with osprey nesting sites near the river, involving students in visual monitoring of the site during the summer. Involved students and teachers would then have the opportunity to attend the actual sampling event at their site (typically in July), giving them a chance to handle osprey and work with professional scientists. Background education on the Institute's research and osprey ecology would be presented to involved teachers and/or students by Institute scientists and/or CFWEP staff during the regular school year. The osprey education program would also work with the CFWEP to develop a unit and/or lesson plan for inclusion in the Clark Fork Teaching Trunks, a resource for teachers, as part of the CFWEP's revision of those materials.

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Gauging Interest:

As part of the Institute's grant proposal for this project, the CFWEP is seeking feedback from teachers regarding their interest in participating. If you would be interested in participating in the osprey education project, please fill out the form below:

Name: Kate McElroy
School: AHS
Grade Level: 10-12
Subject(s): Gen. Bio; Adv. Bio; A&P
Email: mcelroyk@sd10.org
Phone: 503-52609
Signature:  Date: 1/28/08

Osprey Education in the Clark Fork Basin

Background:

The Raptor View Research Institute, a non-profit organization based in Missoula and working with scientists from the University of Montana, in association with the Clark Fork Watershed Education Program (CFWEP), is interested in developing an education outreach program based on their ongoing research on osprey in the Clark Fork Basin. The program would match schools in the basin with osprey nesting sites near the river, involving students in visual monitoring of the site during the summer. Involved students and teachers would then have the opportunity to attend the actual sampling event at their site (typically in July), giving them a chance to handle osprey and work with professional scientists. Background education on the Institute's research and osprey ecology would be presented to involved teachers and/or students by Institute scientists and/or CFWEP staff during the regular school year. The osprey education program would also work with the CFWEP to develop a unit and/or lesson plan for inclusion in the Clark Fork Teaching Trunks, a resource for teachers, as part of the CFWEP's revision of those materials.

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Gauging Interest:

As part of the Institute's grant proposal for this project, the CFWEP is seeking feedback from teachers regarding their interest in participating. If you would be interested in participating in the osprey education project, please fill out the form below:

Name: Pat Bannon
School: Powell Co. High School
Grade Level: 10-12
Subject(s): Biology, Field Ecology
Email: pbannon@pchs.dl.k12.mt.us
Phone: 846-2757 ex. 33
Signature: Pat Bannon Date: 1-28-08

Osprey Education in the Clark Fork Basin

Background:

The Raptor View Research Institute, a non-profit organization based in Missoula and working with scientists from the University of Montana, in association with the Clark Fork Watershed Education Program (CFWEP), is interested in developing an education outreach program based on their ongoing research on osprey in the Clark Fork Basin. The program would match schools in the basin with osprey nesting sites near the river, involving students in visual monitoring of the site during the summer. Involved students and teachers would then have the opportunity to attend the actual sampling event at their site (typically in July), giving them a chance to handle osprey and work with professional scientists. Background education on the Institute's research and osprey ecology would be presented to involved teachers and/or students by Institute scientists and/or CFWEP staff during the regular school year. The osprey education program would also work with the CFWEP to develop a unit and/or lesson plan for inclusion in the Clark Fork Teaching Trunks, a resource for teachers, as part of the CFWEP's revision of those materials.

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Gauging Interest:

As part of the Institute's grant proposal for this project, the CFWEP is seeking feedback from teachers regarding their interest in participating. If you would be interested in participating in the osprey education project, please fill out the form below:

Name: Bill Gallagher

School: BHS

Grade Level: 9-12

Subject(s): Enviro Bio, Chem

Email: callaghanwe@btk.k-12.mt.us

Phone: 494-4897

Signature: [Signature]

Date: 1/28/08

Permits for Osprey Banding and Sampling (Federal, MT State, Univ. of Montana)

1. Federal Bird Banding Permit (Domenech with Greene and Langner as sub-permittees) for Montana and California (4 Pages)
2. Montana Wild Bird Banding or Possession Permit (2 Pages)
3. University of Montana Animal Use Protocol (Greene and Langner), (9 Pages)



United States Department of the Interior
U.S. GEOLOGICAL SURVEY
PATUXENT WILDLIFE RESEARCH CENTER
BIRD BANDING LABORATORY
12100 BEECH FOREST ROAD STE-4037
LAUREL, MD 20708-4037
301-497-5790

Page 1 of 4

FEDERAL BIRD BANDING PERMIT

Permittee: Station RAPTOR VIEW RESEARCH INST., INC ROBERT DOMENECH P O BOX 4323 MISSOULA, MT 59801	Permit Number: 23353	Action: Revise	Action Date: 11/06/07	Issue Date: 08/09/04	Valid Until: 09/30/09
Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Monica Tomasey</i>					
Signature of Permittee					

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

Permittee is Authorized To Band:

All Raptors Except Eagles or Endangered/Threatened Species Unless Specified
GOLDEN EAGLE
(Banding and marking of endangered or threatened species requires a valid
Endangered/Threatened Species Permit.)

In the States of:

CA * MT *

With Special Authorization to:

Trap
Band
Take blood samples
Take feather samples

**And Additionally Authorized to Use The Following
Auxiliary Marking Authorization/s:**

Marker Type	Species	Colors	Locations	Comments
39 Wing/Head/B ack Marker	GOLDEN EAGLE	Blue	MT	BLUE TAGS, WHITE CODESALPHA-NUMBER- NUMBER PATTERN, WITH ALPHA = C
89 Radio Transmitter	GOLDEN EAGLE		MT	NTE 3 $\frac{1}{2}$ TBW; SATELLITES; BACKPACK ATTACHMENT
01A Plastic Colored Leg Band	SWAINSON'S HAWK OSPREY	Blue. Orange. Red, Yellow	Lake, MT Ravalli, MT Missoula, MT	Bands have a small tab projecting and have blk, red & whi symbols

Permittee: Station RAPTOR VIEW RESEARCH INST., INC ROBERT DOMENECH P O BOX 4323 MISSOULA, MT 59801	Permit Number:	Action:	Action Date:	Issue Date:	Valid Until:
	23353	Revise	11/06/07	08/09/04	09/30/09
	Signature of Issuing Official, Chief, Bird Banding Laboratory <i>Monica Tomasey</i>				
Signature of Permittee					

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

The following Subpermittee/s are authorized to band under the direction of the above permittee, in accordance with the same general conditions, and the subpermittee specific authorizations listed below:
 (Number of Active Sub Permittees 5)

23353 - A FULLER S MS 726 ROLLINS MISSOULA, MT 59801

Is Authorized To Band:

All Raptors Except Eagles or Endangered/Threatened Species Unless Specified
 GOLDEN EAGLE
 (Banding and marking of endangered or threatened species requires a valid
 Endangered/Threatened Species Permit.)

In the States Of:

MT *

With Special Authorization to:

Trap
 Band
 Auxiliary mark

23353 - B PITZ T MR 2121 BURLINGTON STREET MISSOULA, MT 59801

Is Authorized To Band:

All Raptors Except Eagles or Endangered/Threatened Species Unless Specified
 GOLDEN EAGLE
 (Banding and marking of endangered or threatened species requires a valid
 Endangered/Threatened Species Permit.)

In the States Of:

MT *

With Special Authorization to:

Trap
 Band
 Auxiliary mark
 Take feather samples

23353 - C MR VINCENT A SLABE 2880 SKYWAY DRIVE HELENA, MT 59602

Is Authorized To Band:

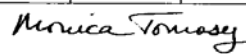
All Raptors Except Eagles or Endangered/Threatened Species Unless Specified
 GOLDEN EAGLE
 (Banding and marking of endangered or threatened species requires a valid
 Endangered/Threatened Species Permit.)

In the States Of:

MT *

With Special Authorization to:

Trap
 Band
 Auxiliary mark

Permittee: Station RAPTOR VIEW RESEARCH INST., INC ROBERT DOMENECH P O BOX 4323 MISSOULA, MT 59801	Permit Number:	Action:	Action Date:	Issue Date:	Valid Until:
	23353	Revise	11/06/07	08/09/04	09/30/09
	Signature of Issuing Official, Chief, Bird Banding Laboratory 				
Signature of Permittee					

Permittee agrees to band in accordance with the general conditions of this permit and with the specific authorization/s listed below:

23353 - D DR ERICK GREENE P O BOX 4323 MISSOULA, MT 59801

Is Authorized To Band:

OSPREY

In the States Of:

MT *

With Special Authorization to:

Trap

Band

Take blood samples

Take feather samples

23353 - E DR HEIKO LANGNER P O BOX 4323 MISSOULA, MT 59801

Is Authorized To Band:

OSPREY

In the States Of:

MT *

With Special Authorization to:

Trap

Band

Take blood samples

Take feather samples

FEDERAL BIRD BANDING PERMIT

Under the provisions of Regulations issued under the Migratory Bird Treaty Act of July 3, 1918 (40 Stat. 755) as amended, or the Bald Eagle Act of June 8, 1940 (54 Stat. 250) as amended, the person named hereon is authorized to capture, for scientific banding or marking purposes, those migratory birds described hereon and to salvage birds accidentally killed during normal banding activities. This permit is subject to the terms, exceptions and restrictions expressed herein and is further subject to any applicable Territorial, State, Tribal or Federal Regulations.

This permit is invalid unless accompanied by any required State permits or licenses.

GENERAL CONDITIONS

1. The Permittee is not authorized to capture or possess migratory birds for any reason other than banding, marking or salvage of banding mortalities for scientific purposes. NOR IS THE PERMITTEE ALLOWED TO HOLD MIGRATORY BIRDS FOR A PERIOD OF MORE THAN 24 HOURS except that the Permittee may possess, for the purpose of donating to a public, scientific or educational institution, birds which die as a result of normal banding activities. Live birds shall be released as soon as practical after capture.
2. The Permittee shall keep RECORDS accounting for the use of all bands received. Periodic RECORDS COVERING THE USE OF THESE BANDS shall be submitted to the Bird Banding Laboratory in accordance with the instructions received there from. Failure to provide data in accordance with the instructions received from the Bird Banding Laboratory is sufficient justification for the revocation of this permit. The Permittee shall keep records of disposition of salvaged banding mortalities for a period of five years and shall be reported to the Bird Banding Laboratory upon request.
3. The holder of this permit shall not sell, exchange, or transfer bands to unauthorized banders or to the general public. All transfers to authorized banders must be communicated to the Bird Banding Laboratory prior to the transfer of bands. Any unused bands remaining when this permit is voluntarily returned, revoked, or expired must be returned to the Bird Banding Laboratory.
4. The Permittee shall, at all reasonable hours, allow any authorized representative of the U. S. Geological Survey or the U.S. Fish and Wildlife Service to ENTER and INSPECT the premises where operations authorized by this permit are being conducted and shall allow such representative to inspect the records relating to such operations.
5. This permit may be SUSPENDED or REVOKED by the Director of the U.S. Geological Survey or authorized representative, if the Permittee violates any of the provisions in the regulations under which this permit is issued or if the Permittee fails to render promptly any reports required. This permit is, at all times, subject to suspension or revocation at the discretion of the Director or representative.
6. This permit is not transferable and must be in possession of the Permittee when exercising the authorizations granted herein.
7. All traps, nets or other capture devices shall bear a TAG or LABEL showing the name, address and permit number of the Permittee; alternatively the trapping area shall be adequately marked with POSTERS provided by the Bird Banding Laboratory. The Permittee's name, address and permit number shall be legibly displayed on such posters.
8. This permit DOES NOT authorize the capture of any birds on any property, public or private without the CONSENT OF THE OWNER OR CUSTODIAN THEREOF.
9. All Banding under this permit is in accordance with the principles, spirit, and intent of the Animal Welfare Act of 1970 and the most recent revision of The Ornithological Council's Guidelines in the Use of Wild Birds in Research.
10. Unless specifically noted on the reverse, the following ARE NOT AUTHORIZED:
 - a. The taking of blood or feather sampling from any bird.
 - b. The use of ANY BAND, clip, paint, dye, signal-sending device or any marking device other than the official numbered leg bands issued by the Bird Banding Laboratory.
 - c. The use of MIST NETS or other nets for the capturing of birds.
 - d. The use of TRANQUILIZING DRUGS OR OTHER CHEMICALS for the purpose of capturing birds.
 - e. Trapping or disturbing the nests or nestlings, for the purpose of banding or marking, of species designated by the Secretary of Interior as "ENDANGERED" or "THREATENED."
 - f. The handling of any PREVIOUSLY BANDED BIRD in any manner which may bias data on file in the Bird Banding Laboratory which pertain to that bird or which may alter that bird's survival potential, behavior or other normal characteristics. This specifically includes adding markers to or removing markers from previously banded birds.

Form 9-475
(July 2007)

MONTANA DEPARTMENT OF FISH, WILDLIFE & PARKS
Wildlife Division
P. O. Box 200701 • Helena, MT 59620-0701 • (406) 444-2612
WILD BIRD BANDING OR POSSESSION PERMIT

Certificate No. 547 (not transferable)

Date Issued: February 28, 2007

Federal Permit No. (If applicable) 23353 (expires 9/30/2009)

Certificate Renewal? Yes ☒ No ☐

Date Expires: September 30, 2009

Fee: No Fee

Permit issued to: Robert Domenech

Address: PO Box 4323

Missoula, MT 59806

Phone Number: (406) 258-6813

Email Address: rob_dom@msn.com

Associated with: Raptor View Research Institute

Permit Type:

BANDING

Permission is granted to Rob Domenech to do the following as provided by Administrative Rule of Montana 12.9.301 (Wild bird permits):

Permittee is authorized to capture, band and release all raptors including Golden Eagles in accordance with USFWS Permit 23353. Permittee is authorized to collect blood and feather samples. Color Marking allowed as approved by the USFWS. Banding areas include Missoula, Lewis & Clark, Ravalli, Granite, and Powell Counties.

Permittee is authorized to collect and use road killed deer carcasses for lure bait to trap Golden Eagles in winter and spring seasons.

An annual report of activities conducted under provisions of this permit must be sent by ~~December 31, 2007, 2008, 2009, and 2010~~ to Montana Fish, Wildlife & Parks, Attn: Wildlife Division, PO Box 200701, Helena MT 59620. The report and associated raw data should include, but not be limited to, information on the survey/collection methods employed, species and number of each sex/age and life history stage observed or handled, date, location (GPS location in latitude-longitude decimal degree format or UTM coordinates and a descriptive location in reference to a prominent nearby landmark), and other important information such as whether the animal was found dead and cause of death, if known. This information will supplement location information in Montana's Wildlife Point Observation Database (POD) which is jointly managed by Montana Fish Wildlife & Parks and the Montana Natural Heritage Program (MNHP). The statewide POD database is used by a variety of users for education, research, planning, and other purposes. In order to facilitate use of this data, it must be submitted in digital format compatible with data fields in Montana's Wildlife Point Observation Database. A permit renewal will not be issued until the report and associated data from the previous year's work have been submitted and accepted.

A helpful resource for deriving location coordinates via the web is the topofinder hosted by the Montana Natural Resource Information System (NRIS) (<http://nris.state.mt.us/topofinder2/default.asp>). Using the world button on the left of the map screen, one can pan on the map to identify the latitude-longitude coordinates at a particular location. An Excel spreadsheet with the report format is available on FWP's website (<http://fwp.state.mt.us/content/getItem.aspx?id=8816>). For pond breeding amphibians, aquatic reptiles, loons, eagles, harlequin ducks, bats and prairie dogs contact the Senior Zoologist at MNHP, (406) 444-3655, Helena, Montana for compatible data formats.

This permit is valid only if the holder also has a current federal permit. A copy of this permit must be in permittee's possession while engaged in banding activities.

This permit is not transferable.

MONTANA FISH, WILDLIFE & PARKS

BY:


Ken McDonald
Administrator, Wildlife Division

Cc: USFWS
Mike Thompson, R2 Enforcement
Kurt Alt, R3 Enforcement
Graham Taylor, R4 Enforcement

12.9.301, ARM. WILD BIRD PERMITS

- (1) The director of fish, wildlife, and parks may issue a certificate or permit for the taking, capturing, and possession of birds protected under 87-5-201, MCA, for the purposes herein specified, as follows:
 - (a) Bird banding as part of scientific investigations;
 - (b) Salvage of birds killed in accidents for school or museum collections;
 - (c) Collecting abandoned birds nest for school and museum collections;
 - (d) Nursing and treatment of sick and injured birds.
- (2) No certificate or permit will be issued for the killing of such birds as a means of collection, except as may be authorized under 87-2-806, MCA, relating to scientific collector's permits.
- (3) No certificate or permit shall allow raptors to pass into private ownership.
- (4) The director may set standards for determining if the merits of a project justify a certificate or permit being issued. He may limit the species and numbers of birds to be taken as well as the means used in taking or capturing. He may limit the period of possession. He may set a time limit during which the certificate is valid and may require a report of any or all activities conducted pursuant to the certificate or permit.
- (5) No fee will be collected in connection with the issuance of such certificate or permit. (History: 87-1-201, MCA; IMP, 87-5-201, MCA; NEW, Eff. 8/4/73.)

Montana Law does not protect rock doves, magpies, crows, starlings, house sparrows and blackbirds.

No State permit, certificate or license is required to band, kill or possess these birds, or to destroy or possess their nests or eggs. However, federal law protects magpies, crows and blackbirds and must be complied with.

Only

IACUC Use

**The University of Montana-Missoula
Institutional Animal Care and Use Committee
Animal Use Protocol**

(Use for wildlife field studies)

Protocol No: **013-07EGDBS-060807**
Start date: **June 8, 2007**
Expiration date: **June 9, 2010**
Amended:

1. Administrative Information:

Project Title: Reproductive success and demography related to heavy metal exposure of Ospreys and Golden Eagles	
Type of Project: <input checked="" type="checkbox"/> Wildlife Animal Research	<input type="checkbox"/> Teaching
Is this application a continuation of a currently or previously approved AUP? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, what is the AUP number?	
AUP approval period cannot exceed 3 years. Preferred start date: June 8, 2007 End date: June 7, 2010	
Principal Investigator: Erick Greene	Work phone: 243-2179 Lab phone: 243-2179
Title: Professor	Fax: 243-4184
Department: DBS and Wildlife Biology	Home or cell phone: 721-1941
E-mail: erick.greene@mso.umt.edu	Office location: HS 205

2. Project Funding:

Agency	Grant No.	Start Date	End Date	PI

3. Project Summary for Lay Person (not to exceed 500 words):

Briefly summarize the overall intent of the study. Your target audience is a non-scientist. Include in your description a EGDBS statement of the objectives and significance of the animal use including potential benefits to humans, animals and/or the advancement of science. Describe what will be done with the animals.

1. Some raptors in western North America have recently been found to have disturbingly high levels of heavy metal contamination. The magnitude and extent of this problem is not known, but it may be a serious issue for wildlife and humans. We will study the levels of heavy metals in Ospreys in the Upper Clark Fork basin of western Montana. We will also collect data on reproductive success rates and demography that may be affected by these contaminants. Preliminary results suggest that levels of mercury may be chronically high in some local Osprey populations (>350 ug/L in the blood of some local Osprey chicks; levels in human blood recommended to be < 6 ug/L). Nests along the Clark Fork River from Deer Lodge to Alberton in addition to several control areas will be selected for the study. We will take small (2 ml) blood samples from Osprey chicks several weeks before they would fledge. The samples will be analyzed in the UM Environmental Biogeochemistry Laboratory (EBL) for mercury, selenium and a range of other inorganic contaminants. In a companion project, we are also cooperating with researchers from the U.S. Geological Survey assessing heavy-metal contamination of Ospreys in the Whiskeytown National Recreation Area, California. Results will give insights into how environmental toxins affect the population of this apex predator, which is viewed by many as an indicator species for the health of riverine ecosystems. We expect these results to be useful for assessing the long-term success of remediation and restoration activities in the Upper Clark Fork watershed.

2. Our collaborator, Rob Domenech of Raptor View Research Institute, has been tagging and sampling blood and feathers from Golden Eagles migrating along the Rocky Mountain Front for a number of years. It also appears that some Golden Eagles may have chronically high levels of lead (mainly from ingesting lead shot from gutpiles). Blood and feather samples from Golden Eagles will be analyzed for heavy metal concentrations.

4. Experience and Training:

List all persons working on this AUP. All individuals listed must obtain training from Laboratory Animal Resources personnel **BEFORE** beginning work with animals **OR** they must be accompanied at all times by trained personnel. Please include years of experience **conducting techniques and working with species proposed in this protocol.**

Name: Erick Greene Title: Professor Department: DBS Office Location: Email: erick.greene@mso.umn.edu Experience: Avian conservation studies (including Ospreys) during last 25 years	Check if: <input checked="" type="checkbox"/> PI Office Phone: 243-2179 Lab Phone: 243-2179 Home Phone: 721-1941 Training approval date: 5/10/07
Name: Heiko Langner Title: Research Assistant Professpr Department: Geoscience Email: heiko.langner@umontana.edu Experience: Experience in Europe working with raptors, including nestling retrieval for buzzard/kite banding project. At least 1 year experience handling ospreys, Golden eagles, and smaller raptors and collecting blood samples. He specializes in analysis of heavy metals.	Check if: <input checked="" type="checkbox"/> Co-PI <input type="checkbox"/> Contact Person Phone 1: 243-6553 Phone 2: Training approval date: 05-16-07
Name: Rob Domenech Title: Executive Director Department: Raptor View Research Institute Email: rob_dom@msn.com Experience: Raptor expert, director of local non-profit raptor research institute. Over 15 years experience in studying raptor migration and biology, involving catching, manual restraint, banding, and blood collection from raptors. He holds a federal master banding permit.	Check if: <input checked="" type="checkbox"/> Co-PI <input type="checkbox"/> Contact Person Phone 1: 258-6813 Phone 2: Training approval date: 5/10/07
Name: Title: Department: Email: Experience:	Check if: <input type="checkbox"/> Co-PI <input type="checkbox"/> Contact Person Phone 1: Phone 2: Training approval date:
Name: Title: Department: Email: Experience:	Check if: <input type="checkbox"/> Co-PI <input type="checkbox"/> Contact Person Phone 1: Phone 2: Training approval date:
Name: Title: Department: Email: Experience:	Check if: <input type="checkbox"/> Co-PI <input type="checkbox"/> Contact Person Phone 1: Phone 2: Training approval date:

5. Study Objectives:

- a. In scientific language, provide a project summary describing the purpose of the experiment(s). **Note:** *Figures cannot be embedded into this document; please submit any figures as e-mail attachments to the IACUC Coordinator, Kathryn.mariucci@umontana.edu.*
1. **Ospreys may be used to gauge the health of riverine ecosystems because of their top position in the food chain and their well-defined diet of local fish. We will measure the accumulation of metals and metalloids such as mercury, selenium, arsenic,**

cadmium, lead from mining-related sources along the Upper Clark Fork basin and Whiskeytown National Recreation Area in California. We will also collect productivity and behavioral data that may be correlated to environmental contaminants. Results will give insight how local environmental toxins affect the populations. We expect these results from Montana to be useful for assessing the long-term success of remediation and restoration activities in the Upper Clark Fork watershed.

About 20 chicks (but perhaps up to 60 - depends on accessibility of nests) along the Clark Fork River from Deer Lodge to Alberton will be selected for the study. Blood and feather samples will be taken from Osprey chicks several weeks before fledging. Chicks will be weighed, banded, and a 2-mL blood sample will be drawn from the brachial vein and 3 to 4 feathers will be cut from the neck and breast. The samples will be analyzed in the UM Environmental Biogeochemistry Laboratory (EBL) for mercury, selenium and a range of other inorganic contaminants.

2. We are cooperating with researchers from the U.S. Geological Survey assessing mining related contamination in the Whiskeytown National Recreation Area, California. Our group will contribute by sampling and analyzing mercury exposure of osprey in the NRA.
3. Our cooperator, Rob Domenech with Research View Research Institute, has been monitoring, trapping, tagging and blood/feather sampling raptors including Golden Eagles along the Rocky Mountain Front for a number of years. The EBL would like to accept these tissue samples for heavy metal analysis.

b. List the specific aims or objectives for the project:

- Preliminary results suggest that local Osprey and Golden Eagle populations may have extremely high levels of heavy metals (in some cases two orders of magnitude greater than EPA cutoff levels for humans). The aims of this project are to:
- Inventory environmental toxins affecting Ospreys in the Clark Fork watershed
- Identify likely sources of contaminants
- Identify effects of the environmental toxins on population density, reproduction, general health of the population
- Our field and laboratory experience acquired during the local osprey project can be effectively applied to other projects such as an Osprey study at Whiskeytown NRA, CA.

c. Briefly describe how the data collected will be used to make decisions regarding the management of the affected species.

Unlike phytotoxic elements such as As, Cd, Cu, Pb or Zn, the effects of elements such as Hg and Se on animal and human health have been largely overlooked within the Upper Clark Fork Superfund Complex. This is partly due to the high cost involved with analysis of these toxins. However, it is clear that mercury and selenium along contaminated rivers pose a serious threat to human and ecosystem health that deserves close attention.

d. Please check applicable boxes below and follow related instructions:

Yes	No	Procedure	Instructions
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Target species	List the target species including, sex, age, and

			strain, when applicable, in part e below.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location of study	Identify the field site location (i.e. country, state, county, city, address, land owner) in part e below.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Field site supervision	Name personnel who will be in charge at the field site(s) supervising seasonal workers in part e below.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Personal protective equipment	List personal protective equipment and safety procedures specific to projects involving potential exposure of personnel to zoonotic diseases in part e below.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Capture techniques	Describe equipment used, bait, frequency of trap checks in hours, maximum duration animals may be held in traps, expected non-target species and numbers, provisions for inclement weather, etc. in part e below.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Animal identification methods	Describe details of PIT tags, elastomers, collars, etc. (including needle gauges) in part e below.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Non-invasive manipulations	Describe non-invasive manipulations such as weighing and measuring and the type and duration of restraint necessary in part e below.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Injections	Describe injected substances, volume, doses, injections sites, needle size and schedules in part e below.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Blood and tissue collection	Describe volume, frequency, collection site, needle size, methodology, protective equipment, etc. in part e below
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Anesthesia	Describe briefly in part e below and provide details in part 6 .
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Non-survival surgery	Describe procedures in detail in part e below.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Survival surgery	Describe briefly in part e below and provide details in Supplemental Section II .
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Animal pain or distress	Describe briefly the expected adverse effects on animals in part e below and provide details in part 9 .
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Animals held in traps for more than 12 hours	Describe in detail in part e below.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Historical animal injury and mortality	Describe historical animal injury and mortality rates associated with your capture and animal handling methods. In the unlikely event that serious injury or illness should occur in remote field conditions, specify your plan for providing veterinary care or humane euthanasia and for final disposition of the animal in part e below.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Collaborating State or wildlife agencies	List any State or wildlife agencies collaborating on this research and their level of involvement. If they are primarily responsible for animal handling and care, include documentation of their level of training and the procedures which they will follow

			for animal care in part e below.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Animal work done at another institution	Describe how the work at the other institution fits into the project in part e below. Include the <u>Animal Welfare Assurance Number</u> for the other institution. Attach the <u>completed protocol form and IACUC approval number</u> from the other institution.

- e. Provide a detailed description of the use of animals (similar to Section F “vertebrate animals” for NIH/PHS 398, Section D5 of NSF or similar). This description should allow the IACUC to understand the experimental course of an animal from its entry into the experiment to the endpoint of the study. Cover all items checked above as instructed in the table. ***Note:** Figures cannot be embedded into this document; please submit any figures as e-mail attachments to the IACUC Coordinator,*
Kathryn.mariucci@umontana.edu.

Target Species:

Ospreys (*Pandion haliaetus*)

Golden eagle (*Aquila chrysaetos*)

Location:

**Along Clark Fork River from Deer Lodge to Alberton, control sites in Montana rivers to be identified,
Whiskeytown NRA, Shasta County, California**

Field site supervision:

Either Erick Greene, Heiko Langner or Rob Domenech will be present at all study sites.

Personal protective equipment:

Access to nests with bucket trucks; nests near power lines accessed with trained Montana power corporation employees. Leather gloves are worn to capture birds. Nitrile gloves and goggles are used for laboratory analysis of samples.

Capture techniques:

Osprey: In the nest, the birds crouch down, and we put our hands over their backs and wings to hold them down. Their wings are held so they do not flap and their legs are grasped on their tarsi above their feet so they do not injure themselves or us. They are quickly hooded so they do not struggle.

Golden Eagles: Eagles are caught in a bow trap and the netting holds them immobile on the ground. The same basic techniques described above are used to hold the wings at their sides, secure their feet and then immediately put a hood over their head. Once they are hooded they become calm and docile and do not struggle.

Animal identification methods:

Aluminum bands provided by USGS Banding Lab

Non-invasive manipulations

Weighing after sliding bird in a cloth sleeve and measuring of hand-held bird according to Raptorview Research Institute protocol; birds handled for < 10 minutes per bird.

Blood and Tissue collection

Each chick will be sampled once. After locally disinfecting the skin with alcohol, 2 mL blood taken from brachial vein using a 25 g sterile needle. Pressure applied for one minute after removing the needle. Three to four fully developed cover feathers are cut from the neck and breast of the bird.

Animal pain and distress & historical animal injury/mortality:

Erick Greene has worked on birds, including Ospreys, for over 15 years. He has routinely taken blood samples from the brachial veins and jugular veins of much smaller birds (lazuli buntings, ca. 13 g and black-capped chickadees, ca. 8 g.) with no injuries to the birds. Heiko Langner has been involved with a raptor banding program in Germany and has handled dozens of buzzards and kites without causing any injury. Rob Domenech of Raptorview Research Institute has handled and tagged 105 golden eagles and over 500 other raptors and has not caused any injury or death to any of the birds handled. Last year, 15 osprey nestlings from 8 nests were banded and blood and feather samples were taken. None of the osprey chicks attempted to fledge early, and the adult birds returned to their normal behavior shortly after the chicks were returned to the nest.

Given the track record of ours of handling hundreds of birds with no injuries, we certainly hope for no mishaps. In the unlikely case of injury to a bird, the protocols of Raptorview Research Institute will be followed. Injured birds would be taken to a federally-permitted raptor rehabilitator specialist. This would maximize the probability that the bird could be successfully rehabilitated. If the bird needed to be euthanized, this facility has the federal and state permits to do so, and the training to kill the animal in as humane a way as possible. If a bird has to be euthanized, the remains would be given to the P. L. Wright Museum at The University of Montana.

Collaborators

1. Raptorview Research Institute. They will be the primary animal handlers. Federal and MT State permits are on file.
2. National Park Service staff at Whiskeytown NRA. Permitting process is pending and permits will be submitted upon receipt.

6. Anesthesia:

- a. Specify in the table below the anesthetic agent for each procedure. Where anesthetic combinations are called for, list each drug separately.

Experiment or Procedure	Drug	Dose	Route	Expected Duration of Anesthesia

- b. Volatile (gas) anesthetic agents:
- Are you using a volatile anesthetic (e.g. isoflurane, halothane)? ☐ Yes ☒ No
 - If using indoors, how will this be vented (e.g., fume hood) or scavenged (e.g., charcoal canister)?
- c. List who will administer the anesthesia and the qualifications and related experience of each person listed:

7. Animals

Complete a separate column for each species to be used. If more than 3 species or strains are to be used, duplicate this page and insert appropriately. Please include all information that applies to the animals you propose to use in this protocol.

	A	B	C
a. Species (common name)	Osprey	Golden Eagle	
b. Gender	<input type="checkbox"/> M <input type="checkbox"/> F <input checked="" type="checkbox"/> Both	<input type="checkbox"/> M <input type="checkbox"/> F <input checked="" type="checkbox"/> Both	<input type="checkbox"/> M <input type="checkbox"/> F <input type="checkbox"/> Both
c. Age Range	6 to 8 weeks	subadults and adults	
d. Weight Range	600 to 1200 g	2 - 5 kg	
e. No. of Animals/Year	80 maximum	50 maximum	

Will the animals be held in a housing facility for an extended period of time? ☐ Yes ☒ No

If yes, describe the housing and period of time they will be housed, how they will be cared for, and the intent for housing them at this location.

If transportation to the facility is required, how will they be transported? Describe caging, vehicles used, provisions for food, water, and access/interaction/sight of other animals during transportation.

8. Justification for Animal Use

- Describe the number of animals to be used for each experiment in the table below.

For each use of animals (e.g., experiment, class, etc.) provide the following information:

<i>Experiment or Procedure</i>	<i>Animals/Group</i>	<i>Groups/Experiment</i>	<i>Experiments/Year</i>	<i>Animals/Year</i>
Clark Fork River osprey sampling	60 maximum	1	1	60
Whiskeytown NRA osprey sampling	20 maximum	1	1	20
Golden eagle sampling	50 maximum	1	1	50

You arrived at these numbers by (check any that apply):

- ☐ Power analyses indicate that the proposed number of experiments is the lowest required for statistically valid tests of the hypothesis.
- ☐ The experiments will compare the effects of several independent variables and therefore require many groups or cohorts.
- ☐ The outcome measures or phenomena being measured are variable and large sample sizes are necessary for statistically valid sampling.
- ☒ Other (explain): **For Ospreys, these sample sizes will provide a good geographic coverage which is needed to ascertain geographic variation in heavy metal loads. For Golden Eagles, these numbers represent the maximum number we anticipate capturing during a good fall migration year. This sample size would allow us to examine variation in lead loads by sex, age, and date.**

b. What is the rationale for using animals in this study? Check all that apply.

- ☒ This research requires behavioral measurements from living animals.
- ☒ This research requires biological measurements or tissue samples from living animals.
- ☐ Other (explain):

c. Explain why the species to be used is appropriate for your research. Check all that apply.

- ☒ This research is a direct extension of previous work on this species.
- ☒ This research seeks to extend previous findings from other species specifically to this species.
- ☐ Nothing is known about the physiological/behavioral phenomena of interest in this species.
- ☐ More is known about related aspects of the physiological/behavioral phenomena of interest in this species than any other.
- ☒ Other (explain): **Ospreys are apical piscivorous predators and thus suitable as indicator species for the health of riverine ecosystems. Golden Eagles may be picking up substantial doses of lead from gut piles left by hunters.**

9. Experimental Stress and Pain:

a. Indicate the appropriate pain and distress category(ies) and the approximate number of animals in each. Sums should equal the total animals from Part 7 above.

Pain and Distress Category (based on USDA categories)	Number of animals per year			TOTALS
	Year 1	Year 2	Year 3	
Pain and distress category C – minimal, transient, or no pain or distress	130 max	130 max	130 max	390 max
Pain and distress category D – pain or distress relieved by appropriate measures				
Pain and distress category E* – unrelieved pain or distress				

*If animals are indicated in category **E**, a scientific justification is required to explain why the use of anesthetics, analgesics, sedatives or tranquilizers during and/or following painful or distressful procedures is contraindicated.

For categories **D and E**, the results of a **targeted literature search** for **alternatives to painful and distressful procedures** must be provided below:

- i. List a minimum of 2 databases consulted (e.g., PubMed, Agricola, Toxline, Biological Abstracts, etc.):
 - (1.)
 - (2.)Additional databases:
- ii. Date of search:
- iii. Years covered by search:
- iv. Key words or search strategies used (e.g., animal model, non animal model, pain, welfare, distress, vitro, culture):
- v. Provide a brief summary of your search results:

10. Euthanasia and Final Disposition of Animals:

- a. If animals **will not** be euthanized, list disposition:

- ☒ Return to wild
☐ Other:

- b. If animals **will be** euthanized, list method(s) of euthanasia:

- ☐ General anesthesia followed by KCl injection – Specify anesthesia in [Anesthesia Table \(part 6\)](#)
- ☐ Overdose of inhalant anesthesia - Specify anesthesia in [Anesthesia Table \(part 6\)](#)
- ☐ Exsanguination under anesthesia - Specify anesthesia in [Anesthesia Table \(part 6\)](#)
- ☐ Barbiturate overdose IV or IP - Specify agent and dosage in [Anesthesia Table \(part 6\)](#)
- ☐ Decapitation - If used without prior anesthesia, you must provide scientific justification*
- ☐ Cervical dislocation - If used without prior anesthesia, you must provide scientific justification*
- ☐ Kill traps
- ☐ Thoracic compression (only small free-ranging birds)
- ☐ Immersion in tricaine methane sulfonate (MS222), benzocaine HCl, or 2-phenoxyethanol – Specify concentration and any buffers used in [Anesthesia Table \(part 6\)](#)
- ☐ General anesthesia followed by gunshot to head
- ☐ Other – please explain

**Provide scientific justification for decapitation or cervical dislocation without anesthesia here:*

- c. Who will be responsible for carrying out the final disposition of the animals?

- d. Where will the final disposition take place?

11. Use of Drug Enforcement Agency (DEA) Regulated Controlled Substances:

- a. Will this project involve any DEA regulated controlled substance? ☐ Yes ☒ No

If you answered "yes" to question #a:

- i. The PI will have a DEA license (or have applied for a license) BEFORE use of controlled substances under this AUP. Provide name on license and license number or the application confirmation number.
- ii. The PI will include the proposed use of controlled substances at appropriate doses.
- iii. The PI will provide appropriate security (anchored cabinet with a minimum of 2 separately keyed doors and limited access to keys or lock combinations) for controlled substances.
- iv. The PI will be responsible for keeping records of controlled substance use on forms provided by UM department of Laboratory Animal Resources.

- b. Are the controlled substances to be used listed in either the anesthesia, euthanasia, or analgesia sections of this AUP? ☐ Yes ☐ No

Note: You must be individually licensed or have applied for a license with the DEA to use controlled substances at The University of Montana-Missoula. By signing this animal use protocol (AUP) you agree to abide by all UM policies and procedures for use of controlled substances. Unauthorized use of DEA controlled substances may result in suspension of the AUP.

12. Federal and State Permits

- a. Are federal, state or international permits required? ☒ Yes ☐ No
It is the responsibility of each PI to inquire about the need for, and obtain if necessary, permits/permission for research on private and public lands.
- b. Do permits cover all personnel involved in this project and listed on the protocol? ☒
Yes ☐ No
If "no", please explain.
- c. Please attach copies of all permits (*Note: please submit as an e-mail attachment*).
- d. List all permits

Federal Permits

Agency Number	Type of Permit	Permit
USGS Bird Banding Lab	Federal banding and sampling permit	23353

State Permits

Agency Number	Type of Permit	Permit
MT FWP	Wild bird banding and possession	547

	permit	

13. Principal Investigator's Statement

I certify that the statements made in this request are accurate and complete and that the animal usage in this protocol does not unnecessarily duplicate previous experiments.

- If I receive approval for this project, I agree to inform the IACUC in writing of any emergent problems. I further agree not to proceed with the project until the problems have been resolved.
- I will not make significant procedural changes to procedures involving animals without
- I agree not to take visitors, including the media, into the animal facility, nor allow them to take photographs or videotapes of animals, without the prior approval of the IA
- UC and LAR director.
- It is my responsibility to ensure that every person working with animals is appropriately trained.
- I will not begin work on the procedures described in this protocol until I receive notice of approval from the IACUC.
- I will keep a copy of this protocol and all subsequent correspondence.

Signature of Principal Investigator: **Erick Greene**

Date: **12 May 2007**

Note: I AM AWARE THAT ELECTRONIC SUBMISSION OF THIS FORM FROM MY COMPUTER CONSTITUTES MY SIGNATURE.

Criteria Statements

Applicant Name: Heiko Langner

Project Title: Raising Awareness of Ospreys and the Clark Fork River Restoration

1. Relationship of Expected Costs to Expected Benefits

It is difficult to quantify the benefits of educational projects as these are investments into the future. Even calculating a cost per person benefiting from the education program can't be done easily since we anticipate this \$25,000 project to reach several hundred participants at a range of levels, i.e. different costs will be associated with different individuals:

A. Two seminars in coordination with the CFWEP in UCFRB communities will be open to the public, and a number of school teachers and Montana Tech faculty have indicated their interest in participating with groups of students (see statements of interest in Supporting Technical Documentation section). Similarly, each sampling visit to Osprey nests can be accompanied by up to 20 visitors, resulting in well over one hundred individuals watching this bird work.

B. We anticipate about fifteen to twenty older (high school) students to work on the citizen science part of the project and thus get deeply immersed into real-life research with a group of biologists and geoscientists. The benefits of extended-involvement programs such as this one can hardly be overestimated. Students will develop a deep sense of ownership not only for the specific Osprey family they study, but also in the UCFRB ecosystem these animals depend on. They will learn to appreciate the complex approach and endurance it requires to follow through with a project like this. Finally, they will be part of a team that produces a valuable data set relating exposure of Ospreys to environmental contaminants to these birds' quality of life and reproduction in the UCFRB. The sense of contributing something useful to our society is an important step toward a satisfying adulthood for these young citizens.

C. Through our engagement with summer camps we will reach a great number of younger (Great school and Middle school) students. Each camp will have up to 15 participants, and we are planning to contribute day-long activities to six camps, bringing the number of children that benefit from these activities to 90.

D. Our project will also be an educational experience for the instructional staff from both organizations cooperating with us. Our presentations will give them a better understanding of Ospreys, their UCFRB habitat and the remediation and restoration of the watershed. The field trips will give them a chance to be in close contact with these large and powerful birds, which can indeed be inspiring for individuals of any age. As most staff members involved in the camps pursue educational career paths, they will be able to share their enthusiasm and knowledge with a very large number of future students in their classrooms.

Besides the educational outcome, a truly unique set of reproductive data for Ospreys in the UCFRB will be produced, which would be difficult to achieve without the citizen science part. We will also obtain and chemically analyze tissue samples from the animals we temporarily retrieve from their nests. This will ensure at least to a minimal extent the continuity of the data we have acquired over the previous years on the contamination status of Ospreys in the UCFRB. Previous studies indicated that young Ospreys accumulate high amounts of selenium and mercury in their tissues, which are left behind by the historic mining operations. Future restoration projects will have to take these contaminants into account if they are to claim a benefit to the environment. The combination of demographic and chemical analytical data will perhaps provide another unique opportunity: to establish a relationship between contaminant exposure and the health of the local Osprey population.

2. Cost Effectiveness

The proposal laid out in this document was developed after multiple discussions within our group and with representatives of the Clark Fork Coalition, NRDP, CFWEP, and MNHC.

The alternative of omitting the project would not yield any of the expected results. We know of no other organizations or individuals in the UCFRB who use raptors to fulfill a similar educational mission as described in this proposal. No tests of the contamination status of UCFRB Ospreys would be conducted. This would lead to a very incomplete knowledge about the pre-restoration exposure of these birds (and the lower levels in the UCFRB food chain) to important toxins such as mercury and selenium. Consequently, the success of the restoration could become questionable, or restoration activities could be blamed if these toxins will be found in wildlife of the UCFRB at a later date.

Another alternative would be to omit any objectives directed toward the collection of monitoring data. As explained in the Technical Narrative, this alternative would not be viable because of conflicts of interest with our most important in-kind service provider (Dave Taylor) and the PI's research mandate as University of Montana Faculty. Further, the student participants would not be able to observe a real-life research project and would never get into close vicinity of these large raptors.

3. Impacts on the Environment and Human Health and Safety

Impacts on the environment are restricted to the temporary removal of Osprey chicks from their nests for banding and tissue sampling. All Federal, State and University permits are in place and no lasting effects on the birds are expected. In fact, Domenech has banded over 500 raptors and wing-tagged over 100 Golden Eagles without inflicting any injuries or mortalities. Greene and Langner are subpermittees on Domenech's set of permits. Ospreys are generally calm birds, and the risk of injury to the bird handler is low. In addition, visitors are generally not allowed to handle raptors, decreasing the risk of injury to them virtually to zero. The boom trucks can only be operated by authorized personnel.

4. Public Support

Our proposed activities were received with great excitement by the organizations we approached. The MNHC and the CFWEP immediately indicated their support and are now cooperators on the proposal. See Supporting Technical Documentation for support letters. We were approached by various media that broadcast in the UCFRB to share results of our preliminary Osprey findings. We know from the numerous responses to radio, TV and newspaper reports that there is great public interest in our work. All but two property owners readily gave us access to their land if they had accessible Osprey nests on them. Furthermore, all were extremely interested in the study itself. We almost certainly know that the involvement of high school students in the study will raise even greater support as most families see this kind of engagement of their children as extremely desirable.

5. Public Access

The Osprey project as proposed does not raise any issues of public access as no permanent structures will be built or removed.

Budget

Budget Narrative

Salaries and Wages

The PI's Langner and Greene will spend 11 and 9 days on the project funded by NRDP, respectively. Research base salaries are applied as stated in the budget table. More time will be needed for scouting field trips, reporting work and student supervision, which will be contributed by the University.

Justin Ringsak, the Education Director of CFWEP will devote 20 hours to the project for organizing meetings and field trips.

Two undergraduate students, Anicka Kratina-Hathaway and Amanda Ormisher, will be working half-time on the project to coordinate with citizen scientists, maintain the database and assist during field trips and lectures. Each student will be paid \$5000 during summer and \$1000 for materials and supplies from the MILES Program (Montana Integrative Learning Experience for Students, funded by the Howard Hughes Medical Institute). One half of these funds are contributed in kind.

A classified permanent part-time employee of the University of Montana (laboratory technician) will be dedicated to conducting blood and feather analyses at the UM Environmental Biogeochemistry Laboratory. Analyses will be conducted on 50 blood and feather samples (20 Osprey chicks, 2 samples each plus 10 quality control samples) for arsenic, lead, cadmium, copper, zinc, selenium and mercury. Tissues will be digested with nitric acid and hydrogen peroxide at elevated temperatures, and then analyzed via ICP-MS (EPA method 6020) and CVAFS for mercury (EPA method 245.7 or 1631).

Fringe Benefits

University of Montana Fringe Benefits of 25% are applied for Langner and Greene. University of Montana health insurance has been added for Langner, prorated for the duration of work on the grant (0.5 months x \$640.00 per month = \$320.00). Fringe benefits and health insurance for Ringsak are \$169.60 as quoted by CFWEP.

Contracted Services

The Montana Natural History Center is contributing one day of each of six summer camps to the Osprey project. Average costs per day are \$30.00 for each of 15 participants per camp, totaling \$450 per day or \$2700 for all six camps.

Rob Domenech will lead the bird sampling field trips and coordinate the rental of the boom trucks. He will also be involved in the education efforts and data processing. He will be funded 14 days, and contribute another 10 days in kind.

Materials and Supplies

Miscellaneous supplies will include items necessary for field sampling such as microcentrifuge tubes, syringes and wipes.

Laboratory materials and supplies for the blood and feather analysis above are included in this category.

Travel

The proposed trips to meetings, scouting field trips and group field trips by the PI's have been estimated to total 2720 miles. We will rent State-owned vehicles through the University of Montana for approximately 1500 miles and use personal vehicles for the remaining trips.

CFWEP requested \$50 for travel to meetings and field trips.

Rent and Utilities

The use of a boom truck owned by Dave Taylor Roofing is an essential part of the project. The trips associated with this proposal will add up to 1320 miles. Fuel costs of \$1.20 per mile will need to be paid. We estimate that we will use the boom truck for sixty four hours (8 d) at a cost of \$200 per hour. This will be donated by Dave Taylor (letter appended), contributing \$12,800 as in-kind contribution to the project.

Miscellaneous

Maintenance and repair for EBL instrument for analysis are included in this category.

The University of Montana overhead cost is included in this category at a rate of 8% of Total Direct Cost.

Cash Matching

The University of Montana will provide cash matching of \$11,696.96. This will be recorded, documented, and reported as matching.

In-kind Matching

In-kind matching is an estimate only and is provided for informational purposes. Project partners have committed to providing in-kind services. However, this will not be recorded, documented or reported as matching.

Budget Summary and Detail Forms

(4 Pages)

2008 Application		BUDGET SUMMARY FORM				
EXPENSE CATEGORY		UCFRB RESTORATION FUND	MATCHING FUNDS			TOTAL
			Cash	In-Kind	Subtotal	
1	SALARIES AND WAGES	\$10,585.03	\$9,921.75		\$9,921.75	\$20,506.78
2	FRINGE BENEFITS	\$3,117.58	\$908.23		\$908.23	\$4,025.81
3	CONTRACTED SERVICES	\$2,550.00		\$4,200.00	\$4,200.00	\$6,750.00
4	SUPPLIES AND MATERIALS	\$2,287.00				\$2,287.00
5	COMMUNICATIONS					
6	TRAVEL	\$1,064.20				\$1,064.20
7	RENT AND UTILITIES	\$1,584.00		\$12,800.00	\$12,800.00	\$14,384.00
8	EQUIPMENT					
9	MISCELLANEOUS	\$3,811.83	\$866.40		\$866.40	\$4,678.22
TOTAL		\$24,999.64	\$11,696.38	\$17,000.00	\$28,696.38	\$53,696.02

In electronic form this spreadsheet will automatically calculate the expense totals from the Budget Detail Form.

2008 Application		BUDGET DETAIL FORM					
EXPENSE CATEGORY		UCFRB RESTORATION GRANT FUND	MATCHING FUNDS			TOTAL	
			Cash	In-Kind	Subtotal		
1	SALARIES AND WAGES (List all worker salaries)						
	Langner (\$368.44/d, 11 d; in kind 5 d)	\$ 4,052.84	\$ 1,842.20				
	Greene (415.91/d, 9 d; in kind 5 d)	\$ 3,743.19	\$ 2,079.55				
	Ringsak (CFWEP, \$16/hr, 20 hours, as quoted)	\$ 320.00					
	Kratina-Hathaway (Undergraduate student)		\$ 3,000.00				
	Ormisher (Undergraduate student)		\$ 3,000.00				
	EBL Lab technician	\$ 2,469.00	\$ -				
Insert Row							
SALARIES AND WAGES SUBTOTAL		\$ 10,585.03	\$ 9,921.75		\$ 9,921.75	\$ 20,506.78	
2	FRINGE BENEFITS						
	Langner (25% + \$320)	\$ 1,333.21	\$ 596.30				
	Greene (25%)	\$ 935.80	\$ 311.93				
	Ringsak (CFWEP, 20 hours, benefits as quoted)	\$ 169.60					
	EBL Lab Technician	\$ 678.98					
	Insert Row						
	FRINGE BENEFITS SUBTOTAL	\$ 3,117.58	\$ 908.23		\$ 908.23	\$ 4,025.81	
3	CONTRACTED SERVICES (LIST BY TYPE)						

	MNHC summer camps			\$ 2,700.00		
	Sub to Domenech (\$150/d, 17 d; in kind 10 d)	\$ 2,550.00		\$ 1,500.00		
	Insert Row					
	CONTRACTED SERVICES SUBTOTAL	\$ 2,550.00		\$ 4,200.00	\$ 4,200.00	\$ 6,750.00
4	SUPPLIES AND MATERIALS					
	Miscellaneous supplies	\$ 395.00				
	EBL analytical supplies	\$ 1,892.00				
	Insert Row					
	SUPPLIES AND MATERIALS SUBTOTAL	\$ 2,287.00				\$ 2,287.00
5	COMMUNICATIONS					
	Insert Row					
	COMMUNICATIONS SUBTOTAL					
6	TRAVEL					
	State vehicle (\$0.485/mle, 1500 mls)	\$ 727.50				
	Personal vehicle (\$0.235/mle, 1220 miles)	\$ 286.70				
	CFWEP mileage (as quoted)	\$ 50.00				
	Insert Row					
	TRAVEL SUBTOTAL	\$ 1,064.20				\$ 1,064.20
7	RENT AND UTILITIES					

	Boom Truck fuel, \$1.20 per mile, 1320 miles	\$1,584		\$12,800.00		
	Insert Row					
	RENT AND UTILITIES SUBTOTAL	\$1,584.00		\$12,800.00	\$12,800.00	\$14,384.00
8	EQUIPMENT					
	Insert Row					
	EQUIPMENT SUBTOTAL					
9	MISCELLANEOUS					
	EBL Instrument Maint.	\$1,960.00				
	UM Overhead (8% of Total Direct Cost)	\$1,851.83	\$866.40			
	Insert Row					
	MISCELLANEOUS SUBTOTAL	\$3,811.83	\$866.40		\$866.40	\$4,678.22
	ALL CATEGORIES SUBTOTAL	\$24,999.64	\$11,696.38	\$17,000.00	\$28,696.38	\$53,696.02